

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEVEN P. CAVE, NELSON G. COOK, CHRIS W.
BAUMGART, and KIM D. LINDER

Appeal 2006-2959
Application 10/066,277
Technology Center 2600

Decided: March 13, 2007

Before KENNETH W. HAIRSTON, HOWARD B. BLANKENSHIP, and
JEAN R. HOMERE, *Administrative Patent Judges*.

HOMERE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal from the Examiner's final rejection of claims 1 through 42 pursuant to 35 U.S.C. § 134. We have jurisdiction under 35 U.S.C. § 6(b) to decide this appeal.

The Examiner rejected claims 1 through 42 as follows:

- A. Claims 1 through 4, 6 through 8, 23 through 26 and 28 stand rejected under 35 U.S.C. § 102 (b) as being anticipated by Esrig.
- B. Claims 5 and 27 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Esrig and Jaber.
- C. Claims 17 and 37 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Esrig, Wallack, Mitsuyama and Jaber.
- D. Claims 9 through 11, 14 through 16, 18 through 20, 29 through 31, 34 through 36, and 38 through 40 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Esrig, Wallack and Mitsuyama.
- E. Claims 12, 21, 32 and 41 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Esrig, Wallack, Mitsuyama and Oosawa.
- F. Claims 13, 22, 33 and 42 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the combination of Esrig, Wallack, Mitsuyama and Cho.

The Examiner relied on the following references:

Esrig	US 4,755,874	Jul. 5, 1988
Jaber	US 5,262,967	Nov. 16, 1993
Mitsuyama	US 5,768,412	Jun. 16, 1998
Oosawa	US 6,151,408	Nov. 21, 2000
Wallack	US 6,748,110 B1	Jun. 8, 2004
Dong-uk Cho, Feature Extraction using Fuzzy Relations for Objects of Various Shapes, IEEE Conference on System, Man, and Cybernetics, vol. 1, 272-275, 1996		

Independent claim 1 is illustrative and representative of the Appellants' invention. It reads as follows:

1. A system operable to substantially automatically perform an evaluation of a sample of a material according to an established standard, wherein the system comprises:

a microscope operable to magnify the sample;

a light source operable to illuminate the sample, wherein the illumination is provided at a grazing angle so as to enhance a contrast between surface features of the sample;

a stage associated with the microscope and operable to move and position the sample under the microscope for viewing;

an image capturing mechanism operable to capture an image of the sample through the microscope; and

a computing device operable to control magnification by the microscope, control illumination by the light source, receive images from the image capturing device, control movement of the stage, and store and execute a computer program operable to substantially automatically conduct an analysis of the image to identify surface features of the sample and determine characteristics of the sample therefrom, and to generate a report setting forth a result of the analysis.

Appellants contend that claims 1 through 4, 6 through 8, 23 through 26 and 28 are not anticipated by Esrig.¹ Particularly, Appellants contend that Esrig does not fairly teach or suggest automatically analyzing an image to identify surface features of a sample under test in order to determine the

¹ This decision considers only those arguments that Appellants submitted in the Appeal and Reply Briefs. Arguments that Appellants could have made but chose not to make in the Briefs are deemed to have been waived. *See* 37 § C.F.R. 41.37(c)(1) (vii)(eff. Sept. 13, 2004). *See also In re Watts*, 354 F.3d 1362, 1368, 69 USPQ2d 1453, 1458 (Fed. Cir. 2004).

characteristics of the sample and to generate a report of the result of the analysis. (Br. 11; Reply Br. 4). For these same reasons, Appellants conclude that claims 9 through 16, 18 through 22, 29 through 36, 38 through 42 are not unpatentable over Esrig in various combinations with Jaber, Wallack, Mitsuyama, Oosawa and Cho. Further, Appellants contend that Jaber does not automatically analyze an image to identify surface features of a sample of concrete. Rather, Jaber requires a user to identify the surface features by viewing the images of the sample of concrete. (Br. 10). Therefore, Appellants submit that the Esrig-Jaber combination would not have rendered claims 5, 17, 27, and 37 unpatentable. Additionally, Appellants contend that Esrig is nonanalogous art (Br. 14, 27) , and that the Examiner failed to properly establish sufficient motivation to combine Esrig with Wallack and Mitsuyama to reject dependent claims 9, 14, 29 and 34. (Br. 23, 24).

The Examiner, in contrast, contends that Esrig teaches the claimed automated analysis of sample features of a surface as a computer system that detect defects wherever located in a chip. (Answer 13). Further, the Examiner contends that it would have been obvious to analyze Jaber's samples of concrete in Esrig's emission microscopy system (Answer 7). Additionally, the Examiner contends that it would have been obvious to combine the teachings of Esrig with those of Wallack and Mitsuyama to render claims 9, 14, 29 and 34 unpatentable. (Answer 9). We affirm.

ISSUES

The pivotal issues in the appeal before us are as follows:

- (1) Under 35 U.S.C. § 102 (b), does Esrig anticipate the claimed invention when Esrig discloses examining a Device Under Test to detect defects wherever located in the chip?
- (2) Under 35 U.S.C. § 103 (a), would one of ordinary skill in the art at the time of the present invention, have found that Jaber renders the claimed invention unpatentable when Jaber teaches a system for semi-automatically testing and inspecting concrete?
- (3) Under 35 U.S.C. § 103 (a), would one of ordinary skill in the art at the time of the present invention, have found sufficient motivation to combine Wallack or Mitsuyama with Esrig by incorporating a color segmentation mechanism into a system for identifying defects in a device under test?

FINDINGS OF FACT

Appellants invented a system (figure 1) for substantially automatically² analyzing the quality of concrete samples. (Abstract). Particularly, a camera (28) in collaboration with a microscope (24) captures a surface image of a prepared sample of concrete (12) disposed on a stage (26). (Specification 8, ll. 17-23). Subsequently, a computer (30) substantially automatically analyzes the captured image to identify surface features and characteristics of the concrete sample. Then, the computer

² We construe the claim limitation “substantially automatically” evaluating or analyzing the samples as being a semi automated evaluation or analysis of the samples by a computer with some human intervention.

substantially automatically generates a report setting forth the analysis results. (Specification 8, l. 32- 9, l. 3).³

Esrig teaches an emission microscopy system for obtaining a global view of an integrated circuit (IC) or Device Under Test (DUT). (Abstract). Particularly, Esrig discloses illuminating and stimulating the DUT to obtain images of defects wherever located in the chip. According to Esrig, each packaged IC device, with the top removed, is placed in a socket through which a computer controls I/O pins connected to a DC voltage.⁴ (col. 2, ll. 59-64). Upon detecting through the microscope an extremely faint light (defect bright spot) in the DUT, a computer operator can direct the camera to take a picture of the defect bright spot. Alternatively, the operator can direct the microscope to intensify or magnify the defect bright spot to further examine it. (col. 5, ll. 9-27). Esrig further teaches a two stage filtering process for separating the bright spots from noise spots to identify the areas of the defects. (*Id.*, ll. 46-56.)

Jaber discloses a system for semi-automatically testing and inspecting concrete. (Abstract). A computer operates and controls a computer driven stage containing the concrete sample under the microscope. (col. 3, ll. 4-8, ll. 20-25). The computer automatically records the linear traverse of the entire traverse pattern. (col. 4, ll. 14-16, ll. 33-34). An operator customizes

3 Appellants' Specification, at page 9, indicates that the computer program utilized to substantially automate the preferred embodiment of the present invention is considered to be within the ability of one of ordinary skill in the art. Further, the Specification indicates that the substantial automation program is achieved by *minimizing human interaction* throughout the sample evaluation process.

4 Generally, ICs emit extremely faint lights as current flows through a damaged dielectric. (col. 1, ll. 9-11).

the computer by assigning functions to each button and by recording such assignments in the configuration file of concrete inspection software on the computer. (col. 3, l. 65-col. 4, l. 5). As the computer stops at a particular interval along the traverse pattern, an operator identifies whether encountered cross hairs are in an air void, paste or aggregate by pressing a customized button on the computer. (col. 4, ll. 54-61; col. 5, ll. 11-18). The operator subsequently records in the computer the beginning and ending coordinate data for air-voids encountered along the traverse pattern. (col. 5, ll. 38-43). The computer uses such recorded coordinate data to calculate the air void contents. (col. 5, ll. 52-55). Data analysis result is subsequently displayed on the computer monitor or printed on a computer printer (col. 5, ll. 63-65).

Wallack discloses a method and system for inspecting the image of a sample object to detect the features of the object. (Abstract). Particularly, Wallack teaches that after acquiring an image data, it is segmented into objects and background pixels to identify and analyze the features of the sample object. (Figure 2). Wallack also suggests that the segmented image may be converted into a run-length encoded image to result in a faster image analysis, which requires and less storage capacity. (col. 6, ll. 27-37).

Mitsuyama teaches a region segmentation technique for differentiating between the background region and the object region of a segmented image. (Abstract). Particularly, Mitsuyama uses color information of an image to achieve an accurate segmentation of the image. (col. 4, ll. 40-54).

PRINCIPLES OF LAW

1. ANTICIPATION

It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim. *See In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

In rejecting claims under 35 U.S.C. § 102, a single prior art reference that discloses, either expressly or inherently, each limitation of a claim invalidates that claim by anticipation. *Perricone v. Medicis Pharmaceutical Corp.*, 432 F.3d 1368, 1375-76, 77 USPQ2d 1321, 1325-26 (Fed. Cir. 2005), citing *Minn. Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1565, 24 USPQ2d 1321, 1326 (Fed. Cir. 1992). Anticipation of a patent claim requires a finding that the claim at issue “reads on” a prior art reference. *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1346, 51 USPQ2d 1943, 1945 (Fed Cir. 1999) (“In other words, if granting patent protection on the disputed claim would allow the patentee to exclude the public from practicing the prior art, then that claim is anticipated, regardless of whether it also covers subject matter not in the prior art.”) (internal citations omitted).

2. OBVIOUSNESS

(Prima Facie)

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the

initial burden of establishing a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). *See also In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. *Id.*, 977 F.2d at 1445, 24 USPQ2d at 1444. *See also Id.*, 745 F.2d at 1472, 223 USPQ at 788. Thus, the Examiner must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the Examiner's conclusion.

3. OBVIOUSNESS

Motivation

On appeal, Appellants bears the burden of showing that the Examiner has not established a legally sufficient basis for combining the teachings of the references that the Examiner relied upon. Appellants may sustain this burden by showing that the Examiner failed to provide sufficient evidence to support that one having ordinary skill in the art would have combined disclosures of the references, as proposed by the Examiner, to yield Appellant's invention. *United States v. Adams*, 383 U.S. 39 (1966); *In re Kahn*, 441 F.3d 977, 987-988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006); *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick, Co.*, 464 F.3d 1356, 1360-1361, 80 USPQ2d 1641, 1645 (Fed. Cir. 2006). The mere

fact that all the claimed elements or steps appear in the prior art is not *per se* sufficient to establish that it would have been obvious to combine those elements. *United States v. Adams, supra; Smith Industries Medical systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1420 (Fed. Cir. 1999). However, “[a]s long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor.” *In re Beattie*, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992). Motivation to combine references under 35 U.S.C. § 103 must come from a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources, to select particular elements, and to combine them as combined by the inventor. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 665, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000).

“[A]n implicit motivation to combine exists not only when a suggestion may be gleaned from the prior art as a whole, but when the ‘improvement’ is technology-independent and the combination of references results in a product or process that is more desirable, for example because it is stronger, cheaper, cleaner, faster, lighter, smaller, more durable, or more efficient In such situations, the proper question is whether the ordinary artisan possesses knowledge and skills rendering him *capable* of combining the prior art references.” *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368, 80 USPQ2d 1641, 1651 (Fed. Cir. 2006).

ANALYSIS

We find that Esrig teaches the invention as recited in representative claim 1. We note that in Esrig the sample or DUT being examined for

defects is the chip with its top removed. We also note that the outer area of the DUT that is immediately exposed to the light can reasonably be construed as the surface of the DUT as it rests on the stage of the microscope. Therefore, by disclosing a computer for examining the image of a DUT to find defects anywhere in the chip including the surface of the DUT, Esrig teaches the claimed limitation of a computer that automatically examines the image of a sample to identify the surface features of the sample and to determine the characteristics of the sample. After considering the entire record before us, we find that the Examiner did not err in rejecting claims 1 through 4, 6 through 8, 23 through 26 and 28 as being anticipated by Esrig. For these same reasons, we also find that the Examiner did not err in rejecting claims 9 through 16, 18 through 22, 29 through 36, 38 through 42 as being unpatentable over Esrig in various combinations with Wallack, Mitsuyama, Oosawa and Cho.

Further, we find Esrig to be analogous art with respect to Appellants' invention, as recited in claims 9, 14, 29 and 34. We find that both Esrig and the subject matter of the cited claims are concerned with a computer-implemented method for inspecting images of a sample to identify possible defects. Therefore, we conclude that both Esrig and the claimed invention are within the same field of endeavor. Additionally, we find that the Examiner properly combined Esrig with Wallack and Mitsuyama to reject dependent claims 9, 14, 29 and 34. As set forth in the findings of fact section above, the Examiner obtained the motivations from the references themselves to justify the proposed combinations. Particularly, Wallack indicates that the image segmentation mechanism offers the benefits of reduced storage space and faster processing of image data. Similarly,

Mitsuyama indicates that the image segmentation based on color allows to discriminate between an object and background pixels of an image.

Therefore, we conclude that one of ordinary skill would have readily recognized such benefits in order to integrate the color segmentation mechanism into Esrig's system to identify spots in a DUT indicating possible areas of defects.

Next, we find that Jaber's teachings amount to a computer for substantially automatically analyzing the image of a concrete sample to identify the surface features and characteristics of the concrete sample, as recited in dependent claim 5. We note that in Jaber, the computer accomplishes a number of functions including (1) operating and controlling the stage where the concrete specimen is examined; (2) recording linear traverse coordinate data; (3) calculating air void contents; (4) displaying analysis results. We also note that in Jaber, with the assistance of the computer, the operator identifies whether cross hairs are in an air void. One of ordinary skill in the art, at the time of the invention, would have readily recognized that Jaber's suggested use of the computer is substantial in the evaluation of the concrete sample. In other words, the ordinarily skilled artisan would have aptly recognized that the use of the computer in the evaluation of the concrete sample, as taught by Jaber, results in a semi-automatic system that minimizes the degree of human intervention, as required by Appellants' Specification. After considering the entire record before us, we find that the Examiner did not err in rejecting claims 5, 17, 27, and 37 as being unpatentable over Jaber.

CONCLUSION OF LAW

On the record before us, Esrig anticipates the claimed invention under 35 U.S.C. § 102 (b), when Esrig discloses examining a Device Under Test to detect defects wherever located in the chip. Further, one of ordinary skill in the art at the time of the present invention, would have found that Jaber renders the claimed invention unpatentable under 35 U.S.C. § 103 (a) when Jaber teaches a system for semi-automatically testing and inspecting concrete. Additionally, one of ordinary skill in the art at the time of the present invention would have found sufficient motivation Under 35 U.S.C. § 103 (a), to combine Wallack or Mitsuyama with Esrig by incorporating a color segmentation mechanism into a system for identifying defects in a device under test.

DECISION

We have affirmed the Examiner's decision to reject claims 1 through 4, 6 through 8, 23 through 26 and 28 under 35 U.S.C. § 102. We have also affirmed the Examiner's decision to reject claims 5, 9 through 22, 27, and 29 through 42 under 35 U.S.C. § 103.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv)(2004).

AFFIRMED

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